AAF MANUAL 25-3

MANAGEMENT OF ALLERGIC DISEASES

U.S. Army Air Forces

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FOREWORD

1. The purpose of this manual is to discuss the diagnosis, treatment, prognosis and disposition of cases of allergic disease occurring in AAF personnel. In selecting the material to be presented, emphasis has been placed upon procedures of proven usefulness in military medicine.

2. Diseases of allergy occur frequently in AAF personnel and it is therefore desirable that methods for their management be generally adopted which are effective and efficient from the standpoint of the patient and the medical officer. Conversely, procedures should be avoided which are unproductive or of an experimental nature. The diagnosis and treatment of the allergic diseases should be directed towards restoring the incapacitated soldier to duty or rendering disposition in cases in which treatment has little probability of success. Lengthy diagnostic or therapeutic procedures for ill-defined allergic factors in clinical disease should be discouraged.

3. In the evaluation of allergic diseases it is important to remember that the degree of incapacitation is influenced not only by the severity of the disease process but also by individual variations in psychosomatic stability, motivation for duty, morale, and integrity.

4. Methods of treatment of allergic diseases in general are described in this manual. The majority of cases seen in AAF hospitals fall into a few groups. Of these, the types of cases which can be profitably treated by specific measures will be indicated. In the latter group may be placed selected cases of pollenosis (hay fever), and vasomotor rhinitis, bronchial asthma, and urticaria (particularly the extrinsic types). Cases of bronchial asthma, (particularly the intrinsic types), severe hay fever, and chronic severe allergic dermatitis which because of their severity or other clinical characteristics are felt to have an unfavorable prognosis should be considered cases for disposition, rather than for prolonged hospitalization for attempted therapy. In addition to specific therapeutic measures, non-specific and palliative measures which are applicable in military practice are also discussed.

5. Particular attention is called to Section V of this manual on the disposition of patients with allergic diseases.

6. This manual is published for the information of AAF medical officers and should not be considered as a directive but as a guide for the management of allergic diseases.

7. This manual is being distributed on the following basis:

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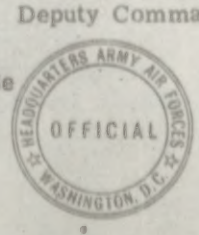

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MANAGEMENT OF ALLERGIC DISEASES

TABLE OF CONTENTS

SECTION I, GENERAL CONSIDERATIONS

	Page
Classification of Types of Allergic States	1
Extrinsic Allergy	1
Inhalant Allergy	1
Food Allergy	1
Drug Allergy	1
Serum Allergy	2
Intrinsic Allergy	2
Bacterial Allergy	2
Physical Allergy	3
Undetermined Intrinsic Allergy	3
Combined Extrinsic & Intrinsic Allergy	3
Psychogenic Allergy	3
Histopathology	3
Allergic Constitution or Diathesis	3
Diagnosis of Allergic Disease	4
Terminology in Diagnosis	4

SECTION II, OUTLINE OF DISEASES OF ALLERGY

Hay Fever	7
Seasonal Classification	7
Diagnostic Characteristics	7
Rhinitis, Vasomotor	8
Asthma, Bronchial	8
Urticaria	8
Angioneurotic Edema	9
Enteritis, Allergic	9
Conjunctivitis, Allergic	10
Eczema (Dermatitis, Allergic)	10
Dermatitis, Contact (Dermatitis Venenata)	10
Anaphylactic Shock	10
Serum Sickness	10
Cephalalgia	10
Reactions to Immunizing Agents	10

SECTION III, ALLERGY TECHNIQUE

Allergenic Extracts	13
Procurement	13
Standardization	13
Supply	13
Skin Tests	14
Inhalants	14
Pollens	15
Foods	15
Vaccines	15
Interpretation of Skin Test Reactions	15
Classification of Degree of Pollen Sensitivity	15
Histamine in the Diagnosis of Vascular Cephalalgia	16
Constitutional Reactions	16
Patch Tests	16
Cytology	17

Page

Pollen Counts 17
Botanic Survey 18
Elimination Diets and Food Diaries 18
Sputum Examination 18
X-ray 19
Vital Capacity Determination 19

SECTION IV, TREATMENT OF ALLERGIC DISEASES

General Principles 21
Pollen Allergy (Hay Fever and Seasonal Bronchial Asthma) . . . 21
Rhinitis, Vasomotor 24
Asthma, Bronchial 24
Status Asthmaticus 25
Urticaria and Angioneurotic Edema 26
Enteritis, Allergic 26
Eczema (Allergic Dermatitis) 27
Serum Allergy 27
Conjunctivitis, Allergic (Vernal Conjunctivitis) 28
Cephalalgia 28

SECTION V, CLASSIFICATION AS TO PROGNOSIS FOR DISPOSITION

General Factors:
Classification of Allergic Diseases for purpose of Disposition 29
Excerpts of Official Regulations 31
Evaluation of Allergic Disease for Recommendations for Disposition 31
Comment 32

MANAGEMENT OF ALLERGIC DISEASES

SECTION I GENERAL CONSIDERATIONS

1. CLASSIFICATION OF TYPES OF ALLERGIC STATES. All allergic diseases may be divided into two principal groups: extrinsic, denoting the etiological agents to be outside the human body (pollens, dust, foods and drugs); and intrinsic, denoting the etiological agents to occur within the human body (bacterial antigens from areas of infection, a state of dysfunction of endocrine glands, neurogenic factors, etc.). Such a classification is important in arriving at prognosis and disposition of patients with allergic diseases as well as diagnosis and treatment, as will be discussed in the appropriate sections of this manual.

a. EXTRINSIC.

(1) Inhalant allergy: The manifestation of allergic symptoms and physical signs as a result of inhalation of various air-borne substances. The majority of cases of allergy having a favorable prognosis fall into this group. They ordinarily respond to treatment by injection therapy with allergenic extracts, which is usually the procedure of choice since the elimination of the offending allergens can rarely be accomplished in military practice.

(a) Principal Diseases:

(1) Hay fever (pollenosis)

(2) Vasomotor rhinitis

(3) Bronchial asthma

(b) Principal allergens: pollens, dust, air-borne molds, cottonseed, feathers and animal danders.

(c) Skin tests: significantly positive.

(2) Food allergy: The manifestation of symptoms and physical signs as a result of ingestion of foods to which the patient is allergic.

(a) Principal Diseases:

(1) Urticaria, angioneurotic edema (chiefly acute cases) and to a lesser extent, vasomotor rhinitis.

(2) Allergic enteritis, bronchial asthma, true allergic migrainous headache and anaphylactic shock occur infrequently and are not a major problem in military allergy.

(b) Principal allergens: Wheat, chocolate, eggs, milk, fish, nuts, tomato, pork, orange, spices, peas, beans and corn.

(c) Skin tests: of little value.

(d) Elimination diets and food diaries: (See Sec. III, par. 10.)

(3) Drug allergy:

(a) A great variety of drugs cause reactions which probably have a sensitization component and may properly be considered with the allergic diseases. The reactions may be manifested as inflammatory, exudative lesions (urticaria, scarlatiniform rash, erythema, erythema nodosum, erythema multiforme, dermatitis), conjunctivitis, fever, blood dyscrasias, hemorrhagic diseases and gastro-intestinal disturbances. Sulfonamides, barbiturates, salicylates, quinine, arsenicals, and bromides are common offenders. An incubation period of seven (7) to ten (10) days is common in individuals not previously exposed to the drug.

(b) Local applications to the skin may produce sensitization and subsequent

contact dermatitis. Common causes are mercury, sulfonamides, local anesthetics, salicylic acid, etc. Local application of sulfonamide ointments has been shown to produce sensitization, both to subsequent local application and systemic administration of the same or other sulfa drugs.

(c) The reactions are not specific for the drug which causes them, and positive identification of the causative drug depends upon collateral evidence such as history, patch testing in contact dermatitis, readministration of the drug, etc. Skin testing is usually of no value. Appearance of new signs and symptoms in an individual receiving medication should be assumed to be due to the drug until proven otherwise. Desensitization to drugs has not proven practical to date. Avoidance of the offending agent is necessary.

(4) Serum allergy: Manifested by the following:

(a) Anaphylactic shock (immediate reaction): The reaction to foreign serum administered parenterally into an individual hypersensitive to such antigen, manifested by urticaria, rhinitis and asthma; at times shock and collapse.

(1) Principal allergens: Therapeutic sera, chiefly horse serum, such as tetanus antitoxin, gas-gangrene anti-serum, snake antivenin, meningicoccic anti-serum.

(2) Skin and ophthalmic tests: usually positive.

(b) Serum sickness (delayed reaction): The syndrome of urticaria, fever, arthralgia and generalized lymphadenopathy occurring as a rule four to ten days following the parenteral injection of a foreign immune serum.

(1) Principal allergens: same as listed under "Anaphylactic Shock".

(2) Skin and ophthalmic tests: usually positive at the time of onset of the disease.

b. INTRINSIC.

(1) Bacterial allergy: The manifestation of allergic symptoms and physical signs as a result of absorption of or exposure to, bacteria or their products.

(a) Principal Diseases:

(1) Bronchial asthma.

(2) Urticaria, chiefly the chronic type.

(3) Vasomotor rhinitis.

(b) Principal allergens: Probably the bacterial proteins or polysaccharides from sites of infection. The chief foci are the paranasal sinuses, tonsils, nasopharyngeal lymphoid tissue, the bronchial mucosa and glands (bronchitis) and, to a less extent, teeth, pelvic organs, prostate and gastrointestinal tract.

(c) Skin tests (with bacterial proteins): are of little diagnostic value.

Note: The most common type of bronchial asthma presenting the poorest prognosis is that associated with infection (bacterial allergy) alone or in combination with inhalant allergy. In general, such cases, unless mild, should be considered candidates for disposition rather than for attempts at therapy.

(2) Physical allergy: The manifestation of allergic symptoms and signs as a result of exposure to various physical agents such as cold, heat, sunlight, etc. This uncommon type of allergy is listed under intrinsic allergy although the syndrome is actually induced by extrinsic factors.

(a) Clinical manifestations: chiefly urticaria and angioneurotic edema and, rarely, vasomotor rhinitis and bronchial asthma.

(b) Principal physical factors: cold (most important), heat and sunlight.

(c) Test by application of cold (ice), heat, and exposure to sunlight or ultraviolet irradiation for five (5) to ten (10) minutes on an isolated skin area results in wheal formation (urticarial wheal).

(3) Undetermined intrinsic allergy:

(a) Many cases of allergic disease, particularly urticaria, vasomotor rhinitis and bronchial asthma, are without demonstrable causative agents.

(b) Such cases have been explained by some investigators as due to an imbalance of "H-substance" and "anti-H-substance"

(c) In some instances such cases may be due to unrecognized bacterial allergy.

(d) The relation of endocrinology to allergy is not definitely known. Evidence has been presented to suggest that endocrine dysfunction (particularly hypothyroidism) may influence the severity of allergic diseases, chiefly urticaria and vasomotor rhinitis, and that hormone therapy (particularly thyroid) may be of value clinically when evidences of deficiency exist.

c. Combined Extrinsic and Intrinsic Allergy:

(1) Many cases, probably the majority of cases of allergic rhinitis and bronchial asthma, are based on combined intrinsic and extrinsic factors. This fact should be emphasized in arriving at prognosis, plan of therapy, and recommendations for disposition.

d. Psychogenic Allergy:

(1) The influence of psychogenic factors on the allergic state and the severity of allergic diseases is of prime importance in determining etiology, establishing prognosis and making recommendations for disposition.

(a) Primary psychogenic factors are manifested chiefly by urticaria, and possibly by vasomotor rhinitis, bronchial asthma and eczema.

(b) Contributory psychogenic factors may play a part in any or all allergic diseases.

2. HISTOPATHOLOGY.

a. The basic histopathology of the allergic reaction is reversible edema, hyperemia and smooth muscle spasm, with round cell infiltration, chiefly eosinophilia, into tissues and secretions.

3. ALLERGIC CONSTITUTION OR DIATHESIS.

a. These terms may be applied in arriving at diagnosis even in the absence of symptoms or physical signs when two or more of the following factors are demonstrable:

(1) Significantly positive skin tests with common allergens.

(2) Past history of allergic disease.

(3) Family history of allergic disease.

(4) Eosinophilia of secretions and blood (when other causes are ruled out). [See Sec. III, par. 8, page 17)

(5) The presence of physical signs of allergic disease, other than the one in question, such as a pale, boggy nasal mucosa.

b. The presence of an allergic constitution suggests that associated and otherwise unexplained clinical symptomatology may be allergic in origin.

4. DIAGNOSIS OF ALLERGIC DISEASE.

a. The diagnosis of allergic disease is made by the recognition of characteristic story, symptomatology, physical signs and laboratory findings. Physical signs should be given greater emphasis than symptomatology in military allergy.

b. In establishing a diagnosis of allergic disease the following material should be considered:

(1) Symptoms and course of present illness (See Chart 1, pages i & ii, appendix)

(2) Physical signs (See Chart 1, pages i & ii, appendix)

(3) Personal history of allergic disease in past life.

(4) Personal history of respiratory infections.

(5) Family history of allergic disease.

(6) Authenticated reports from medical officers as to the presence of physical signs during attacks.

(7) History of known injections of foreign serum and any associated reactions.

(8) Cytology of secretions (nasal secretion and sputum) and blood.

(9) Other laboratory procedures such as vital capacity determinations, bacteriologic studies, etc.

(10) Therapeutic diagnostic procedures, such as the relief of symptoms and physical signs of bronchial asthma by epinephrine and/or aminophylline.

c. The process of determining causative allergens in diagnosis employs the following procedures:

(1) History of onset and clinical course of symptoms; seasonal variation; variation during twenty-four hour periods; relation of symptoms to climatic conditions, fatigue, physical exertion, acute infections, changes in environment, and emotional strain and other psychogenic disturbances.

(2) Skin Tests: (See Sec. III, par. 2.)

(3) Trial elimination: (generally impractical in military surroundings).

(a) Pollens: air filtered rooms.

(b) Inhalants: dust free environment, covering of bedding with allergen proof material, etc.

(c) Foods (See Sec. III, par. 10, a).

(4) Neuropsychiatric Examination:

(a) Since psychogenic factors may markedly influence the severity of allergic disease, they should be carefully considered in arriving at a diagnosis. A neuropsychiatric consultation will be helpful in certain selected cases.

(b) Emotional disturbances in military life may act as factors in the etiology of allergic diseases even in the absence of true neuropsychiatric disease (Example, psychogenic urticaria).

5. TERMINOLOGY IN DIAGNOSIS.

a. The official diagnoses of allergic disease, recorded in AR 40-1025, are as follows:

(1) ANAPHYLACTIC REACTION, severity, cause. (Example: Anaphylactic reaction, moderate, cause-injection of 5 cc. of gas gangrene anti-serum).

(2) ASTHMA, bronchial, cause, severity. (Example: Asthma, bronchial, cause-sensitivity to ragweed pollen, mild; or cause-undetermined, mild).

(3) CONJUNCTIVITIS, acute or chronic, severity, cause. (Example: Conjunctivitis (allergic or vernal), acute, moderate, cause-undetermined).

(4) EDEMA, ANGIONEUROTIC, location, cause, severity. (Example: Angioneurotic edema, face, cause-sensitivity to sulfadiazine, mild).

(5) ECZEMA, severity, location, cause. (Example: Eczema, moderate, arms, legs and face, cause-undetermined).

(6) ENTERITIS, acute or chronic, cause, severity, type. (Example: Enteritis, chronic, cause-sensitivity to milk, moderate, allergic).

(7) HAY FEVER, severity, cause. (Example: Hay fever, severe, cause-sensitivity to grass pollen).

(8) RHINITIS, acute or chronic, type, severity, cause. (Example: Rhinitis, acute, vasomotor, mild, cause-sensitivity to dust and feathers; or cause-undetermined).

(9) SERUM SICKNESS, severity, cause (Example: Serum sickness, severe, cause-injection of 50 cc. of diphtheria anti-serum).

(10) URTICARIA, location, cause, severity. (Example: Urticaria, generalized, cause-undetermined, severe).

6. EQUIPMENT.

a. A list of basic equipment suggested for use in an allergy clinic is given in Appendix.

Page 6 missing

SECTION II. OUTLINE of DISEASES of ALLERGY

1. HAY FEVER. A seasonal allergic rhinitis due to tree, grass, and weed, pollens.

a. Seasonal Classification:

(1) Tree (Spring) hay fever: Tree pollens are the etiological factors; the principle ones include oak, cottonwood, elm, and hickory. Pollenation occurs in general in the Spring between February and May, but varies in the areas of the United States because of climatic differences.

(2) Grass (Summer) hay fever: The various grass pollens, occuring universally, are the etiological factors. Pollen dissemination occurs, in general, in the Summer from May to July, but in the South and Southwest sections in Spring, Summer, and Fall. Many different genera of grasses occur in the various sections of the United States, but, in general, grass pollen dissemination may be considered a single factor in clinical allergy (See Sec. IV, par. 2, a, (4).

(3) Weed (Fall) hay fever: Weed pollens, principally ragweeds, careless weed and other Amaranths, goosefoot and other Chenopods, sagebrush and other Artemisia, Russian thistle and Plantain are the etiological factors. Pollen dissemination occurs, in general, in the Fall between August and frost, but with variations due to climatic differences and plant distribution.

(a) Ragweed pollen dissemination occurs generally in all sections of the United States from the middle of August until frost.

(b) Careless weed and other Amaranth pollen dissemination occurs primarily in the Southern and Western sections from June or July until frost.

(c) Pollen dissemination of goosefoot and the other Chenopods, sagebrush and other Artemisia, and Russian thistle (Salsola) occurs primarily in the Western sections from June or July until frost.

(4) Mountain cedar (Winter) hay fever: Mountain cedar and other Junipers, considered separately because of the time of pollen dissemination, shedding pollen in December, January and February in the Southern and Southwestern sections and in the extreme Northwest as late as April.

Note: See figure III, map of the United States, showing zones of pollen dissemination with a table of the relative pollen concentrations in these areas.

b. Diagnostic Characteristics:

(1) Seasonal occurrence.

(2) Symptoms: Paroxysms of sneezing; intermittent nasal obstruction; watery nasal secretion; lacrimation, redness, and itching of the eye; and itching of palate. Symptoms are usually most prominent in the early morning, irrespective of daily variations in the atmospheric pollen concentration.

(3) Physical signs: Pale, boggy, glistening nasal mucosa, lacrimation and redness of the eyes.

(4) Cytology: the nasal secretion is characterized by an eosinophilia.

(5) Etiology: pollen (See Sec. II, par. 1,a, page 13).

(6) Skin tests: skin tests with an extract of the offending pollens are positive.

c. Prognosis: good with treatment in the majority of cases.

d. Treatment: (See Sec. IV, par. 2).

2. RHINITIS, ALLERGIC (Vasomotor rhinitis). This allergic disease has the following characteristics:

a. Non-seasonal occurrence.

b. Symptoms: Nasal symptoms resemble those occurring with hay fever. Eye symptoms are usually not present.

c. Physical signs: These are similar to hay fever except that eye signs are usually absent.

d. Cytology: Same as hay fever.

e. Etiology: Inhalant allergens: dust, animal danders, seeds, etc.; food and drug allergens; intrinsic factors (infection, endocrine dysfunction, etc.).

f. Skin tests: Positive in extrinsic, negative in intrinsic, allergy.

g. Diagnosis: History, physical signs, skin test, and cytology.

h. Prognosis: Good in extrinsic cases; variable in intrinsic cases.

3. ASTHMA, BRONCHIAL. An allergic state, characterized by wheezing, dyspnea and cough occurring usually in attacks but at times continuous (status asthmaticus).

a. Season: Seasonal (when due to pollens usually associated with hay fever) and non-seasonal (intrinsic and extrinsic factors other than pollens)

b. Symptoms: Dyspnea, wheeze, cough.

c. Physical signs: Prolonged expiration, normal resonance or hyperresonance, sibilant and sonorous sounds.

d. Cytology: Eosinophiles in sputum.

e. Etiology: (See Sec. I, par. 1, a,b,c,d).

f. Skin tests: Positive in extrinsic cases.

g. Diagnosis: Physical signs, skin test, cytology and history.

h. Prognosis: Good with treatment in extrinsic asthma, poor in intrinsic asthma.

i. Complications: Pulmonary emphysema, bronchiectasis, cor pulmonale (occurs in intrinsic type).

j. Treatment: (See Sec. IV par. 4).

4. URTICARIA. Urticaria (hives) is manifested by cutaneous wheal formation, associated with surrounding erythema, usually itching, and at times pain. The lesion may be located in any skin area of the body and may vary from a few millimeters in diameter to involvement of entire skin areas. Urticaria has no seasonal variations in incidence. Diagnostic skin tests may be either positive or negative. Cases of urticaria can be divided into two types; acute and chronic, which differ in etiology, prognosis and treatment as described below.

a. Acute Urticaria. Acute urticaria is characterized by a sudden onset, a duration of a few hours to several days, involvement of any skin area, and with or without associated angioneurotic edema. The etiological factors are usually extrinsic (ingested food or drug, injected serum or drugs) or rarely acute infection (such as acute upper respiratory infections). The syndrome is self-limited when the cause is eliminated and therefore the prognosis is usually good.

b. Chronic Urticaria: Chronic urticaria is characterized by the continuous presence of lesions, or frequent recurring attacks, with or without associated angioneurotic edema. The etiology is considered as a rule to be intrinsic (chronic infection such as tonsils, teeth, sinuses, nasopharyngeal lymphoid tissue, or gastro-intestinal tract; endocrine disfunction such as decreased thyroid activity) and psychogenic factors. Chronic urticaria in many cases is intractable and should be considered cause for separation from the service when severe (See Sec. V, par. 1, d). Occasional cases result from extrinsic causes. When a case of chronic urticaria of intrinsic or psychogenic etiology is seen during the initial attack, it must be differentiated from acute extrinsic urticaria by attempting to establish the presence of extrinsic etiological factors.

c. Differences between acute and chronic urticaria may be summarized as follows:

	Acute	Chronic
(1) Season:	non-seasonal	non-seasonal
(2) Skin tests:	positive or negative	positive or negative
(3) Etiology:	food, drug, injected serum, acute infection	psychogenic factors; chronic infection (teeth, tonsils, sinuses and gastro-intestinal tract), endocrine dysfunction (decreased thyroid activity)
(4) Diagnosis:	typical wheal	same as acute
(5) Prognosis:	good	variable
(6) Treatment:	(See Sec.IV, par. 6 page 25)	

5. ANGIONEUROTIC EDEMA. Angioneurotic edema is an edematous lesion of the deeper layers of the skin and of the subcutaneous tissue, representing the same type of physio-pathology as urticaria. While it may occur in any area of the body, the common sites are the eyelids, lips, tongue, hands and feet. It may develop independently or in association with the urticaria.

a. The acute and chronic types of angioneurotic edema have the same etiological differences as do the corresponding types of urticaria.

b. Laryngeal asphyxia or other serious visceral involvement may result from angioneurotic edema of such tissues.

6. ENTERITIS, ALLERGIC. This syndrome is the result of ingestion of certain foods or drugs to which the patient is sensitive and is characterized by abdominal pain, diarrhea and at times nausea and vomiting. It may be associated with purpura of the skin and bleeding from the gastro-intestinal tract (Henoch's purpura).

a. Season: non-seasonal.

b. Symptoms: generalized abdominal pain, diarrhea, nausea and vomiting.

c. Physical signs: generalized tenderness of abdomen, but no involuntary rigidity. Edematous mucosa by proctoscopic examination.

d. Cytology: eosinophiles may be demonstrated in the mucous of the stools.

e. Etiology: ingested food or drug.

f. Skin Tests: usually negative.

g. Diagnosis: this diagnosis may be difficult to establish. The association of an allergic constitution (see Sec. I, par. 3), the absence of a leukocytosis and abdominal rigidity, the presence of eosinophiles in the stool, and the relief of symptoms with allergic therapy are factors that suggest the diagnosis.

h. Prognosis: good with elimination of offending allergens.

i. Treatment: (See Sec. IV, par. 7 page 25)

7. CONJUNCTIVITIS, ALLERGIC. The symptoms of redness, itching and lacrimation of eyes, frequently seasonal (Spring and Summer) associated with hyperplasia of the palpebral mucosa (at times a typical cobblestone appearance) are characteristic of this disease. An allergic etiology is rarely demonstrated. There is an eosinophilia of the eye secretion. The latter finding and the symptomatology, especially itching, differentiates this disease from other diseases of the eye, such as trachoma. A consultation by an ophthalmologist is indicated in these cases.

8. ECZEMA (DERMATITIS, ALLERGIC) Eczema is an inflammatory disease of the skin, characterized by a papulovesicular eruption and lichenification frequently generalized, but chiefly on the flexural surfaces of the upper and lower extremities and the face and neck, associated with itching and occurring in individuals with an allergic constitution. The disease is usually not suitable for allergic management in military medicine. Treatment and disposition should be made on a dermatological basis. (See AAF Manual 25-1"Management of Common Cutaneous Diseases".)

9. DERMATITIS, CONTACT (DERMATITIS VENENATA). Contact dermatitis is an inflammatory disease of the skin, characterized by vesicles, oozing and itching, induced by a sensitivity to contact with mineral, animal or plant matter. Since this is usually not suitable for allergic management in military medicine, it is suggested that treatment and disposition of these cases be made on a dermatological basis. Etiological factors, however, may be investigated by means of patch tests (See Sec. III, par. 7) page 10)in the allergy clinic.

10. ANAPHYLACTIC SHOCK: This syndrome is described under "Serum Allergy", Sec. I, par. 1, a, (4), page 4. It occurs chiefly after an injection of foreign serum to which the patient is allergic, but may result from administration of other substances such as drugs and rarely foods.

a. Treatment: See Sec. IV, par. 9, a, (1) and (2) page 26

11. SERUM SICKNESS. See Sec. I, par. 1, a, (4), (b) page 4

a. Treatment: See Sec. IV, par. 9, b page 26

12. CEPHALALGIA. Most headaches occurring in military personnel are not allergic in etiology, but are due to psychogenic causes or associated with infectious or other types of organic disease.

a. Migraine: Migraine denotes a group of symptoms manifested by severe incapacitating headache, unilateral or bilateral, of several hours or days duration, nausea and vomiting, photophobia and visual disturbances. The visual disturbances may be manifested in one of several patterns, including scintillating scotomata, hemianopsia amblyopia and "gun-barrel" vision, which frequently precedes the onset of the headache. Migraine is rarely allergic in origin but, when so is usually due to idiosyncrasies to foods or drugs.

b. Vascular (histamine) headache. This type of headache is unilateral, usually frontal, usually nocturnal, of short duration (ten to sixty minutes), worse in recumbent position and associated with redness and lacrimation of the conjunctiva and dilatation of the temporal vessels on the homolateral side.

13. REACTIONS TO IMMUNIZING AGENTS. Allergic manifestations, chiefly urticaria, angioneurotic edema and anaphylactic shock, may occur following injections of certain immunizing agents into sensitive individuals. These agents are as follows:

a. Tetanus Toxoid: Routine skin testing strength is 1-100, test with 1-10 may be done when test with 1-100 is inconclusive. The active allergen is a proteose used in preperation of the toxoid.

b. Typhus and Equine Encephalomyelitis Vaccines: Testing strength same as that of tetanus toxoid; the active allergen is egg.

c. Smallpox, yellow fever, typhoid and cholera vaccines are not likely to induce allergic manifestations.

SECTION III. ALLERGY TECHNIQUE

1. ALLERGENIC EXTRACTS

a. Procurement: The allergenic extracts as listed under c, below, for use in AAF hospitals are prepared at the AAF Allergy Laboratory, AAF Regional Hospital, San Antonio Aviation Cadet Center. They will be supplied to AAF hospitals having qualified allergists by requisition addressed to the Commanding General, Headquarters, Army Air Forces, Washington 25, D. C., Attention: Supply Division, Office of the Air Surgeon (AAF Ltr 42-74.)

b. Standardization of Extracts: The allergenic extracts for use in skin testing and injection therapy are standardized on the basis of the protein nitrogen content as determined by phosphotungstic acid precipitation. One (1) protein nitrogen unit (P.N.U.) is the equivalent of 0.00001 milligrams of protein nitrogen.

c. Supply of Extracts:

(1) The following allergens will be supplied to AAF hospitals:

a. For skin testing only:	Strength of extracts in protein nitrogen units per cc
Mixed feathers	100
Cottonseed	100
Dog dander	100
Cat dander	100

b. For skin testing and for treatment*

Timothy	10,000
Bermuda grass	"
June grass	"
Plantain	"
Ragweed	"
Careless weed	"
Sage brush	"
Russian thistle	"
Goosefoot	"
Cottonwood	"
Oak	"
Mountain cedar	"
Hickory	"
Elm	"
Alternaria	"
Hormodendrum	"
Helminthosporium	"
Aspergillus	"

House dust

Polyvalent stock vaccine - concentrated - One billion mixed organisms per cc

(2) The polyvalent vaccine is prepared according to the technique recorded in TM 8-227, W.D., "Handbook for Laboratory Technicians", 17 October 1941, containing killed streptococci, staphylococci, micrococci, etc. This is supplied in a concentration of one billion organisms per cc. Serial dilutions may be prepared at the local stations. (For clinical use of the stock vaccine, see Sec. IV, par. 3, a, (1), (b), page 23)

(3) Sterile buffered saline, to serve as diluting fluid will be supplied in bottles of sixty (60) cc., and in vials of nine (9) cc., and four and a half (4.5) cc., with which serial dilutions of the concentrated extract may be made to prepare extracts in strength of one thousand (1000), one hundred (100), and ten (10) P.N.U. per cc.

d. Dilution of extracts: Buffered saline (diluting fluid) is prepared according to the following formula:

Potassium dihydrogen phosphate	0.36 gm.
Disodium phosphate	1.43 gm.
Sodium chloride	5.00 gm.
Phenol	4.00 cc.
Distilled water to make	1,000.00 cc.

Dilution of extracts is accomplished by the addition of buffered saline to a more concentrated extract, resulting in a larger volume of a weaker extract. By the addition of one (1) cc. of an extract to nine (9) cc. of diluting fluid, an extract of one-tenth (1/10) of the original strength can be prepared. For example, one (1) cc. of an extract containing ten thousand (10,000) protein nitrogen units per cc. injected into a vial or bottle containing nine (9) cc. of diluting fluid will make an extract containing one thousand (1,000) protein nitrogen units per cc. Dilutions of extract should be made by multiples of ten (10) for clinical use in all instances.

e. Sterility of Extracts: All allergenic extracts and the buffered saline supplied by the AAF Allergy Laboratory are prepared and tested for sterility under conditions specified by and according to the requirements of the National Institute of Health.

(1) Extracts and buffered saline are sterilized by passage through Seitz filters.

(2) The stock vaccine is sterilized by heat according to directions in TM 8-227, 17 October 1941.

2. SKIN TESTS. All skin tests with sterile extract are performed intracutaneously, using one (1) cc. volume sterile syringes and twenty-five (25) gauge needles of one-fourth (1/4) inch length. Each syringe is washed thoroughly after using.

a. Skin tests are carried out as follows:

(1) The site of preference is the upper arm.

(2) The largest number of tests on one arm should be eighteen, spaced in three, rows of six.

(3) The topmost skin tests are to be at a level which would permit a tourniquet to be applied above them in case of constitutional reactions. (See Sec. III, par. 6), page 18

b. The proper volume of extract used in skin testing ranges between one-fiftieth (1/50) and one-hundredth (1/100) cc. In practice, this represents the smallest amount of solution which, when injected beneath the most superficial layer of the epidermis will produce a readily recognized bleb.

c. The routine testing strengths of extracts are as follows:

(1) Inhalants:

(a) Dust	- 100 P.N.U. per cc. initially and 1000 P.N.U. per cc. (if indicated) after fifteen (15) minutes
(b) Feathers	- 100 P.N.U. per cc.
(c) Cottonseed	- 100 P.N.U. per cc.
(e) Dog epithelium	- 100 P.N.U. per cc.
(f) Cat epithelium	- 100 P.N.U. per cc.
(g) Air-borne molds	- 100 P.N.U. per cc. initially and 1,000 and 10,000 (if indicated) P.N.U. per cc. after fifteen (15) minute intervals.

(2) Pollens: All pollen extracts are tested by titration in order to determine the degree of skin sensitivity as follows:

(a) Testing with all pollen extracts is done initially with the strength of ten (10) P.N.U. per cc. and is repeated after fifteen (15) minutes with the extract of one hundred (100) P.N.U. per cc. in cases failing to reveal a marked reaction when tested with the higher dilution. Testing with extracts of one thousand (1,000) P.N.U. per cc. is carried out after fifteen (15) minutes unless a marked reaction is obtained with extracts of one hundred (100) P.N.U. per cc. Rarely, testing with a strength of ten thousand (10,000) P.N.U. per cc. is indicated when the weaker extracts have failed to induce a marked reaction.

(b) Testing with extracts of all pollens may be conducted simultaneously when the above schedule is observed; i.e., the initial testing is performed with extracts containing ten (10) P.N.U. per cc. and the subsequent testing is done at fifteen (15) minute intervals with one hundred (100), one thousand (1000) and rarely ten thousand (10,000) P.N.U. per cc. in this order.

(3) Food allergens: Skin testing with extracts of food allergens fails to reveal positive reactions in the majority of clinically food sensitive patients. For this reason the routine use of this procedure in military allergy is not advisable.

(4) Bacterial Vaccine (polyvalent stock vaccine and autogenous vaccines): Skin tests are performed intracutaneously on the volar surface of the forearm, using 0.3 cc. of vaccine. The routine strength is 1-100 dilution although subsequent tests may be made with a 1-10 and/or a 1-1000 dilution as indicated.

(5) Immunizing agents: See Sec. II, par 13 page 11.

3. INTERPRETATION OF SKIN TEST REACTIONS.

a. Immediate: Interpretation of the skin test reactions with pollen and inhalant extracts is made approximately fifteen (15) minutes after testing as follows:

(1) Negative: No reaction.

(2) Slight: A small wheal, less than 1.0 centimeter in diameter.

(3) Moderate: A wheal larger than one centimeter in diameter but without pseudopodia.

(4) Marked: A wheal as large or larger than the size of a moderate reaction, with pseudopodia.

b. Delayed: Interpretation of the skin test reactions with the Polyvalent stock vaccine (or autogenous vaccines) is made at twenty-four (24) to forty-eight (48) hours and the reaction is recorded as 1#, 2#, 3#, and 4# depending upon size of the erythema and edema, in the same manner as interpretations of the tuberculin test are recorded in general medicine. A general scheme of interpretation is to record any reaction less than the size of the half dollar as 1# or 2#, and one larger than this as 3# or 4#.

(1) Skin tests with bacterial vaccines are not to be construed as necessarily indicating the presence or absence of clinical bacterial sensitivity but may be used as a guide in determining the treatment dosage schedule with the vaccine. (Some authorities are of the opinion, however, that a positive reaction denotes clinical sensitivity while a negative one does not preclude it).

4. CLASSIFICATION OF DEGREE OF POLLEN SENSITIVITY. Each patient should be classified as A, B or C according to the degree of skin sensitivity demonstrated by intracutaneous testing. The class in which the patient is catalogued is determined by the weakest pollen extract that induces a marked reaction. The following table indicates the three (3) classes of sensitivity:

Class A - Marked reaction with 10 P.N.U. per cc.

Class B - Marked reaction with 100 P.N.U. per cc.

Class C - Marked reaction with 1,000 or 10,000 P.N.U. per cc.

In general, the initial treatment dosage and the increase in subsequent dosage varies according to the degree of skin sensitivity. For example, a patient with Class C sensitivity will tolerate more rapid increase in dosage than a patient with Class A or B sensitivity. See Sec. IV, par. 2, a. (1), page 21.

5. HISTAMINE IN THE DIAGNOSIS OF VASCULAR CEPHALALGIA: The syndrome of vascular or histamine headache, described in Sec. II, par. 12, b, page 11, may occasionally be induced in susceptible subjects by the subcutaneous injection of histamine (diphosphate or hydrochloride). The recommended initial test dose is 0.01 mgm. of histamine base (0.1 cc. of a 1-10,000 dilution). If a headache is not induced in fifteen (15) or twenty (20) minutes, a test dose of 0.1 mgm. (0.1 cc of a 1-1000 dilution) is administered. If unsuccessful the dose may then be increased to 0.5 mgm. (0.5 cc. of a 1-1000 dilution) in an attempt to induce the symptoms and physical signs of this syndrome. Since the latter dose may induce a non-specific headache in any individual, care should be exercised in evaluation of this test.

6. CONSTITUTIONAL REACTIONS. Reactions following skin testing or injection therapy may be manifested by generalized erythema and pruritis, urticaria, angioneurotic edema, bronchial asthma, rhinitis, conjuctivitis, anaphylactic shock and collapse. They usually occur within twenty (20) minutes after a test or injection but may be more delayed. Epinephrine (1-1000) and a tourniquet should be on hand at all times in the allergy clinic in case of constitutional reactions.

a. Prevention:

(1) Whereas skin testing with inhalant effluents such as feathers, cottonseed and animal dander in strengths of 100 P.N.U. per cc. may be conducted as a rule with safety, testing with pollen, dust and mold extracts should be carried out with serial dilutions in order to avoid constitutional reactions. (See Sec. III, par 2, c, (2), page 15).

(2) The occurrence of increasing size of local reactions (swelling and redness at the site of injection) accompanying subcutaneous injections of increasing dosage of pollen and inhalant (dust and molds) extracts should be a warning of a potential constitutional reaction. Following a reaction the dosage should be reduced to the strength of the second or third injection previous to that causing the reaction. Subsequently, an attempt may again be made to increase the dosage according to schedule.

b. Treatment. A tourniquet is applied proximal to the site of injection, and three-tenths (0.3) cc. of epinephrine (1-1000) is administered subcutaneously in the opposite arm, and repeated if necessary. The tourniquet is loosened at times and reapplied until no signs of the reaction are present.

7. PATCH TESTS. Patch tests are performed by placing a small portion (0.025 to 0.05 cc.) of the testing material upon the skin of the arm or back, covering it with a piece of cellophane about the size of a quarter and covering overall with adhesive tape. A positive reaction is an area of dermatitis at the test site occurring within seventy-two (72) hours. The patch should be allowed to remain at least forty-eight (48) hours unless severe itching ensues. Solid substances can be tested directly. Liquid substances are tested by using a small square of white blotter soaked with the liquid testing material.

a. Patch testing materials. In general, any substance suspected of inducing contact dermatitis may be tested. The following groups are listed:

(1) Plants: When acetone or alcohol extracts of plants are not available patch testing may be performed with a small macerated segment of leaf or pollen bearing portion of the fresh plant in question.

(a) Common contact dermatitis-inducing plants include Rhus (poison ivy and oak), parthenium (feverfew) and ragweed.

(2) Medical drugs, such as mercurials, sulfur precipitate, sulfonamides and ointments containing local anesthetics.

(3) Dyes, such as in shoe leather, gloves and clothing.

(a) Contact dermatitis from the dye of army uniforms is uncommon.

(4) Metals, such as nickel, tin, cobalt and silver, as in jewelry and instruments.

(5) Cosmetics, such as soap, talcum powder and nail polish.

(6) Hydrocarbons, such as benzene, naptha, cleaning and lubricating oils.

8. CYTOLOGY. Cytologic examination of the blood, nasal secretions, and sputum are of value in the diagnosis of allergic disease. It may be reported in percentage of eosinophiles, although it does not necessarily indicate the degree of allergic activity. In general, five (5) per cent or more may be considered as eosinophilia.

a. Cytology of blood: Blood eosinophilia, when not induced by parasitic infestation, is indicative of allergy and will be noted in routine examinations of blood smears.

b. Cytology of nasal secretions and sputum. It is important that the smears be prepared with thin strands of mucous and with the least amount of trauma to prevent destruction of the cellular membranes.

(1) Giemsa stain (the stain of choice in routine use, particularly when several smears are to be examined): Smears are fixed in methyl alcohol for five (5) minutes, allowed to dry, submerged in a freshly prepared staining solution for twenty (20) minutes and washed in distilled water.

(a) The "stock solution" of Giemsa stain is prepared by dissolving the crystals in glycerine and methyl alcohol. Since the proper procedure varies with each brand of stain, the directions recorded on each bottle of crystaline stain should be followed in preparing the stock solution, which remains stable indefinitely. (See TM 8-227, W.D., 17 October 1941).

(b) The "staining solution" is prepared in proportions of one (1) drop of the stock solution to one (1) cc. of distilled water. (Example: forty (40) drops of stock solution dissolved in forty (40) cc. of distilled water). This is unstable and must be prepared daily.

(2) Wright stain (for use when Giemsa stain is not available or when a single smear is to be examined).

(a) The same procedure as that for staining of blood smears applies (See TM 8-227, W.D., 17 October 1941).

(3) Field stain

(a) Fix nasal, sputum or blood smear in methyl alcohol for one (1) minute

(b) Stain for one (1) second in Eosin and wash.

(c) Stain for one (1) second in methylene blue and wash.

(d) Blot and examine.

(Note 1: Eosin is used first)

(Note 2: For Preparation of Field Stain see Appendix).

9. POLLEN COUNTS. Pollen counts are performed by applying a thin layer of petrolatum to an ordinary glass slide and exposing the slide out of doors for a period of twenty-four hours. The exposed slide is protected with a "roof" as illustrated by the drawing in Figure 11. It is examined under the low power microscopic lens and the number of pollen grains encountered in

five (5) "trips" across the slide designates the number of pollen grains per cubic yard of air. Pollen counts are advisable when performed by qualified personnel since they are of value in determining the type and quantity as well as the onset of dissemination of pollen in the atmosphere.

10. BOTANIC SURVEY. In addition to knowledge of atmospheric pollen, botanic surveys, accurately and thoroughly made, and repeated at different seasons, offer further help in determining offending pollens in the patient's immediate vicinity. The season of pollinating, the quantity and ease of obtaining pollen from blossoms, the scarcity or abundance of plants, are important aids in determining the plant's significance in pollen allergy. Correlation of the history of time and place of symptoms with the botanic survey and the result of skin tests is of great value in determining what pollen extracts to use for injection therapy. It is not necessary to qualify as a botanist in order to recognize most of the plants which are common offenders in pollen allergy.

11. ELIMINATION DIETS AND FOOD DIARIES. Two (2) cardinal principles are to be observed in selected cases suspected of food allergy regardless of the nature of the disease: elimination diets and food diaries.

a. Elimination diets. A basic elimination diet consisting of foods not commonly eaten is useful in cases having daily symptoms and physical signs. It serves merely as a means of maintaining nutrition and preventing hunger while the effect of elimination of possible food allergens is being observed.

(1) Sample basic diet: lamb, chicken, pears, peaches, apricots, prunes, brussel sprouts, broccoli, turnips, egg plant, squash, cauliflower, rice, tea, salt and sugar.

(2) When relief of symptoms ensues, individual foods may be added every three (3) or four (4) days, beginning with common foods such as wheat and wheat products, milk and milk products, eggs, etc. A saline cathartic should be administered after symptoms and signs occur. Further additions of food to the diet is withheld until symptoms subside when individual foods are added as described above.

(3) Synthetic Vitamins, particularly thiamine chloride and ascorbic acid, should be prescribed when an elimination diet is continued longer than one (1) week.

b. Food diary. A food diary is the choice method of diagnostic observation when symptoms are sporadic. The diary should be accurate, including beverages and "snacks taken between meals", to be of value.

(1) All foods eaten are recorded as the patient eats them. An "X" is marked in the proper date column indicating each food ingested. When the food is eaten before noon, "X" is placed in left side column; when at noon "X" is placed in the middle of the column, and when after noon, "X" is placed at right side of column.

(2) Additional foods, when eaten, are added to the list. When a food is eaten for the second time, it is not relisted but is indicated by an "X" in the line corresponding to that particular food.

(3) Analysis of the diary may be carried out after several attacks of allergic manifestations have developed (See Appendix, Figure 5).

(4) Complex foods such as stew, soups, hash, etc. should not be eaten by the patient when he is recording a food diary.

Note: Hospitalization of patients for observation for food allergy should not be done except in rare instances. Such cases should be considered for disposition or returned to duty depending upon the general medical picture.

12. SPUTUM STUDIES. Sputum examinations, both gross and microscopic, should be performed on all patients under observation for bronchial asthma.

a. Gross factors. - Foamy, clear and mucoid, except in the presence of bronchial or lung infection when it may appear purulent.

b. Microscopic factors: Eosinophilia (see Sec. III, par 8, page 17); repeated examinations should be performed until the presence or absence of eosinophiles is established.

(1) Examinations for acid-fast bacilli should be done as indicated.

c. Bacteriologic factors: Not characteristic, even in intrinsic asthma, the cultures varying in different areas of the United States. Alpha streptococcus and micrococcus are the most commonly encountered organisms, and organisms considered to be pathogenic are usually not demonstrable, except in patients with acute respiratory infections.

d. Curshman's spiral (gross) and Charcot-Leyden crystals (microscopic) may be demonstrated but are of academic interest only and examinations for such are not recommended for routine use.

13. X-RAY. X-ray studies may be beneficial in evaluating cases of allergic disease as follows:

a. Paranasal sinus: X-ray studies usually demonstrate any suppurative sinuses disease which may act as a focus of infection.

b. Chest: X-ray studies are of value as follows:

(1) Normal films are obtained in uncomplicated cases of bronchial asthma.

(2) X-ray examination is of great value in the differential diagnosis between bronchial asthma and other types of pulmonary disease.

14. - VITAL CAPACITY DETERMINATION:

a. Bronchial asthma per se: The use of this procedure is usually not necessary since the extent of any one attack of asthma can be ascertained by the physical examination.

b. Complications of bronchial asthma: Vital capacity determinations are of value in evaluating the extent of pulmonary emphysema, bronchiectasis, pulmonary fibrosis, etc. that may complicate any case of asthma.

(1) Determinations may be made using a simple spirometer into which the patient fully exhales after he has made the greatest inspiration possible. The determinations may be recorded on graph paper by use of a basal metabolism apparatus when the apparatus is calibrated.

Page 20 missing

SECTION IV. TREATMENT OF DISEASES OF ALLERGY

1. GENERAL PRINCIPLES. The treatment of allergic diseases embodies both specific therapy ("hyposensitization") and symptomatic treatment. Specific therapy, in general, alleviates or reduces the degree of clinical sensitivity as manifested by symptoms and physical signs, but does not completely prevent the occurrence of the disease, except in occasional cases after prolonged treatment. Consequently, symptomatic therapy should be prescribed in conjunction with specific treatment. Both types of therapy are outlined under the heading of each allergic disease in this section of the manual. Although all etiologic factors, including psychogenic, endocrine dysfunction, etc. should be considered in treatment, the specific therapy of allergic diseases is based on the following two general principles.

a. Elimination of Offending Allergens. This may be accomplished by the physical removal of the offending substances from the environment of the patient, such as by covering bedding with dust-proof covers in cases of feathers or cottonseed sensitivities, elimination of offending foods from the diet, arranging air-filtered rooms when practical (to eliminate pollen), and eradication of definite foci of infection.

b. Specific Injection Therapy: This is accomplished by the systematic injection of appropriate allergenic extracts (hyposensitization), such as dust, pollen and air-borne mold extracts, and possibly vaccine as described in the appropriate paragraphs of this section.

2. Pollen Allergy (Hay Fever and Seasonal Bronchial Asthma).

a. Treatment, specific. Preseasonal, Coseasonal or Perennial injection therapy may be used.

(1) Preseasonal injection therapy is inaugurated several weeks (preferably three (3) months) prior to the onset of the pollen season, the initial dose given being the weakest strength of extract showing a marked skin reaction by tests. The injections are given subcutaneously, well beneath the skin, into the fatty part of either upper arm. Care is taken that the extract is not given intramuscularly or intravenously. It is desirable to keep the total volume of each injection below 0.7 cc because of pain often accompanying large volumes.

Injections may be given at semi-weekly intervals. An interval of longer than one (1) week is not desirable in preseasonal therapy. Injected pollen allergen continues to circulate as such in the blood for at least forty-eight (48) hours, but is usually gone at the end of seventy-two (72) hours. Because of the possible cumulative effect, injections more often than every three (3) days are not desirable.

To achieve a maximum or protective dose of pollen extract preseasonally is most important, as the accomplishment of this appears to influence the results obtained more than any other single factor in injection therapy of pollen allergy. The maximum dose may be defined as the single dose containing the greatest number of protein nitrogen units which can be reached after a series of graduated increasing doses, without the production of unusual local symptoms, or constitutional reactions of any degree. The maximum dose theoretically acclimatizes the tissues to pollen so that contact in a normal fashion does not produce clinical symptoms.

To determine the maximum dosage for each patient is often difficult. The three factors which primarily influence its size are: (1) The degree of skin sensitivity to pollen extracts (See Classification of Degree of Skin Sensitivity in Pollen Allergy). A patient with a Class A skin test reaction will not likely achieve the same maximum dosage as a Class C patient. (2) The toxicity of the offending pollen. Tree and grass pollen are not nearly so toxic as weed pollens, particularly ragweed and Russian thistle. A patient with grass pollen hay fever would require a much less total dosage than a patient with Russian thistle or ragweed pollen allergy. (3) The concentration of atmospheric pollen in the immediate vicinity and the degree of exposure to same. A soldier with ragweed hay fever in an area where ragweed was minimal, doing office work, would need less of the pollen extract to protect him than a soldier with field duties where ragweed was abundant.

In instances of sensitivity to more than one group of pollens, as grass and ragweed pollen, the extracts may be combined in one treatment set, representing a percentage of each,

as fifty per cent (50%) ragweed and fifty per cent (50%) grass extracts. One (1) cc of 10,000 P.N.U. strength of this extract represents 5,000 units each of ragweed and grass extract given. This dosage may not be sufficient for adequate protection. Since the maximum dosage which may be attained in the same individual with different pollens may vary and since maximum protection may be required from different pollens at different times of the year, it is preferable to administer each pollen separately, and by a different dosage schedule if necessary, in order to attain and administer accurately the maximum dose for each.

The following schedules are guides to proper dosage, the choice of which is to be used depending on the class of skin test sensitivity to pollen extracts.

	The Dosage in Protein Nitrogen Units		
Sequence of Injection	Class A (Mrk. skin test to 10 P.N.U./cc)	Class B (Mrk. skin test to 100 P.N.U./cc)	Class C (Mrk. skin test to 1000 P.N.U./cc)
1	1	10	10
2	5	20	25
3	10	40	50
4	15	70	100
5	25	100	300
6	40	200	600
7	60	300	1000
8	80	500	1500
9	100	700	2000
10	150	1000	3000
11	200	1500	5000
12	300	2000	7000
13	500	3000	9000
14	900	4000	10000
15	900	5000	10000

Treatment during the hay fever season. If maximum dosage is not reached in preseasonal treatment, or if the dosage level is relatively low, gradual increase in dosage according to schedules listed may be followed or the greatest dose attained preseasonally may be maintained. If the maximum dose was reached preseasonally, the dosage may be reduced by one-third (1/3) to one-half (1/2) and continued at weekly intervals throughout the season. If more than normally expected symptoms occur, coseasonal treatment may be given in addition. In Class A sensitivity (very sensitive) cases, in which group most constitutional reactions occur, it is well to keep the patient in the clinic for a period of thirty (30) minutes after receiving the injection, in order to control any symptoms of constitutional reaction that may occur. In the event of constitutional reaction, the next dose to be given should be one-half (1/2) the amount of that dose which produced the reaction.

(2) Perennial Therapy. Perennial treatment takes up where preseasonal leaves off. After continuing injection therapy through the hay fever season, a maintenance dose is given at intervals of every two to three (2) to (3) weeks throughout the year. The maintenance dosage may be the maximum amount reached in preseasonal treatment, or, if the dosage level acquired is not high, a gradual increase in dosage according to schedule may be accomplished. It is advisable that the dosage not be given at such infrequent intervals or the amount so high as to produce constitutional reactions. Intervals between injection should never be greater than three (3) weeks. An interval of four (4) weeks necessitates reduction of dosage by one-third (1/3), an interval of six (6) weeks by one-half (1/2), an interval of eight (8) weeks precludes continuation of that particular dosage schedule, and a new one must be instituted, beginning with the weakest strength of extract producing a marked skin test reaction.

(3) Coseasonal Therapy. This type of treatment is instituted in cases presenting symptoms during the pollenating season. As no treatment has been given prior to the onset of symptoms, skin tests with appropriate pollen extracts are done to determine the degree of skin

sensitivity, and treatment begun by intracutaneous injection of the weakest strength of pollen extract producing a marked skin reaction. Injections are given at two (2) to four (4) day intervals, very slowly increasing the dosage as the patient's tolerance permits. As symptoms subside, subcutaneous injections may be instituted according to schedule in order to continue with perennial therapy. The rule of "undertreatment" is preferable to "overtreatment", particularly in treating pollen asthma.

(4) Appropriate extracts to be used in treatment are as follows:

(a) Tree season (Spring): Therapy with extracts of each individual tree pollen inducing a positive skin test, when dissemination of the pollen or pollens has been demonstrated or is considered likely.

(b) Grass season (Summer): Therapy with extract of only one grass pollen. (Any one of the grass pollen extracts may be used, see Sec. III, par. 1, c, (1), page 13.)

(c) Weed season (Fall): Therapy with pollen extracts as indicated by the results of skin tests as follows: (See Figure 3, page 21).

Zone I.	Ragweed
Zone II.	Ragweed and Careless weed
Zone III.	Ragweed, Russian thistle, Sagebrush and Careless weed
Zone IV.	Ragweed, Russian thistle, Sagebrush and Careless weed

(d) Mountain Cedar (Winter): Therapy with mountain cedar pollen extract.

b. Treatment, Symptomatic.

(1) Symptomatic or medicinal therapy of hay fever and asthma should be instituted, when indicated, in addition to specific therapy since specific therapy in most cases alleviates, rather than prevents, symptoms.

(a) Nose drops and sprays.

(1) 1% Ephedrine Sulfate in saline

(2) 1/2% - 1/4% Neosynephrine
(Caution! The continued use of local therapy may lead to secondary irritation of nasal mucosa).

(b) Eye drops:

(1)

Pontocaine HCL	.01
Epinephrine hydrochloride (1 - 1000)	8.0
Boric Acid	1.0
Saline, normal $\overline{qs}$ ad	30.

Sig: Two drops in each eye P.R.N.

(c) Oral Medication:

(1) Ephedrine Sulphate: 0.024 Gm. q.4.h. P.R.N.

(2) Propadrine hydrochloride: 0.024 Gm. q.4.h. P.R.N.

(d) Parenteral Medication: Epinephrine, (1-1000) 0.3 cc. may be given subcutaneously and repeated twice at thirty (30) minute intervals if necessary. Thereafter, 0.3 cc. may be given every three (3) or four (4) hours as indicated, although, if relief is not obtained after these (3) doses, other therapeutic measures should be used.

(e) Inhalation: Epinephrine (1-100) solution by nebulization in certain selected cases, when parenteral administration is not practical.

3. RHINITIS, VASOMOTOR.

a. Treatment, Specific: Many cases of vasomotor rhinitis are of "undetermined etiology" (probably intrinsic) and are not suitable for allergic therapy. Those cases reacting by skin test to inhalant extracts are treated by elimination of the reacting inhalants and injection therapy. (Dust extract is the most important inhalant extract used in injection therapy; air-borne mold extracts are of value in certain cases). The frequency of injections may be once or twice weekly and, after clinical improvement is obtained, once or twice monthly.

(1) Injection therapy:

(a) Dust and Air-borne molds: Injection of gradually increasing dosages of dust extract similar to that outlined for preseasonal and perennial pollen therapy in hay fever, depending upon the strength of extract required to induce a marked skin test with pseudopodia, except that, in general, therapeutic doses of dust extract should be approximately ten (10) times weaker than that of pollens. Care should be exercised in regulating the dosage so that the patient's symptoms are not aggravated by the administration of too large a dose. In general, those patients showing a marked reaction to extract of one hundred (100) P.N.U. per cc. may be treated according to preseasonal therapy of a class A pollen sensitivity (initial therapeutic dose being one (1) P.N.U.) whereas the ones requiring test with one thousand (1,000) P.N.U. per cc. may be treated according to the schedule of a class B pollen sensitivity (initial therapeutic dose being 10 P.N. Units), except the maximum dose should rarely be over three thousand (3000) P. N. Units (See Sec. IV, par. 2, a, (1), page 21). Occasionally, dust sensitive patients will respond more favorably when treated with even smaller doses of extract such as 0.1 P.N. Unit increased to three hundred (300) P.N. Units.

(b) Vaccine: Polyvalent stock or autogenous vaccine is used in cases of intrinsic and combined extrinsic and intrinsic allergy. The schedule of dosage with stock or autogenous vaccine may vary with the degree of delayed skin test reactions. In the absence of an unusually positive reaction (3+ to 4+), the initial dose may be 0.1 cc. of a dilution of 1-1000 with an increase of 0.2 cc. until a maximum dose of 0.1 cc. of a 1-10 dilution is attained (unless unusual local reactions occur). It is advisable to begin injection therapy with 0.1 cc. of a 1-10,000 or greater dilution in cases showing a delayed skin test reaction greater than 2+, the dosage being increased in a similar manner as described above.

(2) Food-sensitive cases are managed as described in Sec. III, par. 11, page 18.

b. Treatment, Symptomatic. Same as outlined for hay fever, (See Sec. IV, par. 2, b page 22).

4. ASTHMA, BRONCHIAL. (other than seasonal)

a. Treatment, Specific:

(1) Extrinsic cases are treated with elimination and injection therapy (primarily dust and air-borne molds) in the same manner as treatment of vasomotor rhinitis.

(2) Intrinsic cases associated with bronchitis, acute or chronic; suppurative and hyperplastic sinus disease or chronically infected upper respiratory lymphoid tissues are treated as follows:

(a) Eradication or treatment of the foci of infection when practical.

(b) Polyvalent stock or autogenous (sputum, sinus washing, nasal cultures) vaccine injection therapy as described for rhinitis, vasomotor. (See Sec. IV, par. 2, a, (1), (b) above).

(c) Since the prognosis of intrinsic cases is not good in humid climates, it may be desirable to recommend duty assignment for certain selected patients in a dry climate, such as Colorado, Arizona, New Mexico, Utah, Nevada, southeastern California, and western Texas.

(3) Treatment with sulfonamides in cases due to, or associated with, acute respiratory infection (acute nasopharyngitis, sinusitis, bronchitis and pneumonitis) is beneficial although is not of proven value in chronic intrinsic asthma associated with chronic respiratory infection. The criteria for the use of sulfonamide therapy (and the dosage used) should depend upon the clinical and laboratory findings (white blood total and differential counts, sedimentation rate determinations, bacteriological findings, etc.) as in respiratory infection unassociated with asthma.

(4) The value of antibiotic agents such as penicillin is as yet unproven in the treatment of bronchial asthma.

(5) Psychotherapy, including reassurance. "The patient, as well as the disease, should be treated."

b. Treatment, Symptomatic:

(1) Epinephrine (1-1000) 0.3 cc. subcutaneously and repeat twice at thirty (30) minute intervals if necessary. Thereafter, 0.3 cc. may be given every three (3) or four (4) hours as indicated, although, if relief is not obtained after three (3) doses, other therapeutic measures should be used.

(2) Aminophylline, 0.24 to 0.48 Grams intravenously and repeat every four (4) hours if necessary.

(3) Ephedrine sulfate, 0.024 Grams orally every four (4) hours PRN.

(4) Potassium iodide (saturated solution) 0.5 cc. to 2 cc. every four (4) hours orally.

(5) An efficacious "Asthma Mixture" is as follows:

KI	15.00
Ephedrine sulfate	.75
Glycerine	7.50
Saccharine	0.66
Tincture of Hyoscyamus	16.60
Simple syrup	100.00

Sig. 4 cc. every four (4) hours.

(6) Oxygen inhalation, using a mask, tent or nasal catheter.

(7) Calcium gluconate, 1 Gram, intravenously.

5. STATUS ASTHMATICUS. A state of bronchial asthma, characterized by intense dyspnea and wheezing, continuous for a period of three (3) or four (4) days or longer and not appreciably influenced by the use of simple therapeutic measures such as ephedrine or epinephrine. It is usually associated with the formation of extremely viscid, tenacious sputum which interferes with the lung capacity, frequently leading to cyanosis and exhaustion, and occasionally death. The large majority of cases are the intrinsic type, but when associated with extrinsic etiology, elimination of such factors as dust (closed windows and doors), other inhalants (dust proof bedding covers) and pollen (air-filtered room) should be carried out in addition to the symptomatic therapy.

a. Treatment, Symptomatic:

(1) Fluids. Adequate fluids orally and intravenously (5% glucose 1,000 to 3,000 cc.) Epinephrine, (1-1000) one (1) cc. and aminophylline, one (1) Gram, may be added to the infusion.

(2) Sedation: barbiturates, bromides, chloral and paraldehyde. Morphine is absolutely contraindicated and should never be used.

(3) Rectal anesthesia (preferably under the supervision of an anesthetist).

(a) A mixture of ether and olive oil or mineral oil, thirty (30) to sixty (60) cc.

(b) Avertin, 40 to 60 mgm. per kilo of body weight.

(4) Other Measures. Expectorants, epinephrine, aminophylline, oxygen and helium (if available) as outlined in par. 4,b.

(5) Psychotherapy, including reassurance.

6. URTICARIA AND ANGIONEUROTIC EDEMA.

a. Treatment, Specific and Non-specific

(1) Acute:

(a) Catharsis, saline or castor oil.

(b) Elimination of suspected food or drug allergens as determined by the history.

(c) Treatment of any acute infection which may be present.

(2) Chronic:

(a) Treatment or eradication of foci of infection.

(b) Psychotherapy.

(c) Dilute hydrochloric acid (U.S.P.) 1 cc. to 2 cc. t.i.d. with meals.

(d) Autohemotherapy (10 cc. of blood drawn from patients arm and injected into the buttocks).

(e) Elimination of suspected food allergens, in rare cases, by use of elimination diets and food diaries. (See Sec. III, par. 10).

(f) Histamine injection therapy, in the manner described in Sec. IV, par. 11, b, (2), may be beneficial in some cases although its value is unproven.

(g) Vermifuge (in parasitic infestation).

b. Treatment, Symptomatic:

(1) Epinephrine (1-1000), 0.3 cc. subcutaneously and repeat every two (2) hours for three (3) doses if necessary.

(2) Ephedrine sulphate, orally, .024 Gms. every four (4) hours if necessary.

(3) Calcium gluconate, 1 Gm. intravenously.

(4) Calamine lotion, cool starch, oatmeal or sodium bicarbonate baths locally.

(5) Sedation with barbiturates.

7. ENTERITIS, ALLERGIC.

a. Treatment:

(1) Epinephrine (1-1000), 0.3 to 0.5 cc. subcutaneously for diagnostic and therapeutic

observation. The acute abdominal pain of this disease may be dramatically relieved by epinephrine.

(2) Saline catharsis (when diagnosis is certain).

(3) Establishment and elimination of offending food or drug allergens.

8. ECZEMA (ALLERGIC DERMATITIS): Since this disease is usually not suitable for allergic management in military medicine, it is suggested that these cases be treated by the dermatologist and/or be considered cases for disposition, depending upon the severity. (See AAF Manual 25-1, "Management of Common Cutaneous Diseases").

9. SERUM ALLERGY.

a. Anaphylactic shock:

(1) Prophylaxis: An accurate personal, past and family history of allergy should be ascertained, as well as the past history of a previous injection of foreign serum, from each candidate for serum therapy. The individual is then skin tested with horse (rabbit, etc) serum in a 1-10 dilution using the routine technique for skin testing (See Sec. III, par. 2). Cases strongly suspected of being sensitive to foreign serum are tested initially with a dilution of 1-100. In the presence of a positive skin test the ophthalmic test is performed by instilling one or two drops of horse serum 1-10 into one eye and observing any redness and lacrimation. Evaluation of skin and ophthalmic tests are outlined as follows.

(a) Negative skin and eye tests: serum may be given with impunity.

(b) Positive skin and negative eye tests: serum may be given with caution, using small volumes at first.

(c) Positive skin and eye tests: serum should be given only as a life saving measure and with extreme caution using "hyposensitization", i.e. beginning with a minute volume such as 0.1 cc. subcutaneously and gradually increasing every hour until 10 cc. is administered. Subsequently, attempts may be made to administer the serum intravenously in small volumes.

(2) Active Treatment: The general principles are those of treatment of the shock or impending shock, including the following:

(a) The patient should be kept warm with blankets, hot water bottles, etc.

(b) Epinephrine (1-1000), 0.3 to 0.5 cc. subcutaneously or, if the shock is advanced, intravenously (or even intracardially, as a life saving measure) and repeated in fifteen (15) minutes if necessary.

(c) Fluids, including one thousand (1000) cc. intravenously.

(d) Tourniquet, to be applied proximal to the site of injection of foreign serum when it has been given subcutaneously.

b. Serum Sickness:

(1) Treatment:

(a) Fluids orally and parentally.

(b) Epinephrine (1-1000), in small doses such as 0.2 cc. every hour for five doses each day as indicated.

(c) Calcium gluconate, one (1) Gram intravenously, three (3) to four (4) times daily.

(d) Salicylates orally up to ten (10) Grams daily.

(e) Morphine Sulphate, subcutaneously, if necessary.

10. CONJUNCTIVITIS, ALLERGIC (VERNAL CONJUNCTIVITIS). This disease has been reported as rarely based upon sensitivity to extrinsic allergenic factors, in which case the therapeutic problem would be the same as for hay fever or vasomotor rhinitis. In general, however, it is not amenable to allergic therapy and is suggested that such cases be referred for management to an ophthalmologist. This disease is not to be confused with the eye symptoms associated with hay fever.

11. CEPHALALGIA.

a. Allergic Migraine:

(1) Symptomatic emergency treatment:

(a) Epinephrine (1-1000) subcutaneously, 0.3 to 0.5 cc.

(b) Oxygen inhalation for twenty (20) to thirty (30) minutes.

(c) Ergotamine tartrate (gynergen) parenterally (0.25 mgm.) and repeat once if necessary. Tablets of this drug may be of value orally (1 mgm.) when taken at onset or during the stage of scotomata preceding the headache.

(2) Specific treatment: Specific treatment embodies the determination and elimination of the etiological allergen, usually food or drug by history, and food diaries in rarely selected cases.

b. Vascular or Histamine Headache: This type of headache is not proven to be of allergic nature but has been classified with the allergic diseases because it is relieved at times by epinephrine and responds to treatment with histamine. Suggested therapeutic measures are as follows:

(1) Epinephrine (1-1000) 0.5 cc. subcutaneously for emergency relief.

(2) Therapy with histamine injections (hydrochloride or diphosphate) has proven to be of value in certain cases. Several plans of treatment may be used.

(a) The intravenous administration of 1 mgm. of histamine in one thousand (1000) cc. of saline solution daily for two (2) weeks or more.

(b) Subcutaneous injections, once or twice daily, of increasing doses of histamine, beginning with 0.1 cc. of 1-1,000,000 and increasing by 0.1 or 0.2 cc. until a mild toxic reaction develops following an injection. The dosage may then be reduced to a sub-toxic level and maintained at weekly intervals.

SECTION V. SUGGESTED CLASSIFICATION FOR THE PURPOSE OF DISPOSITION OF PATIENTS WITH ALLERGIC DISEASES

1. GENERAL FACTORS

a. Many cases of allergic disease in military personnel are difficult to classify for purposes of disposition. The following scheme is recommended as an aid in evaluating the prognosis in mild, moderate, and severe cases of allergic disease. Such cases should be considered not only from the viewpoint of allergic disease but also from the standpoint of other associated diseases. Factors influencing the personality of the allergic individual may alter the symptomatology of mild allergic disease to the extent that it may simulate moderate or severe allergic disorders. The morale and integrity of the individual, the motivation for duty, psychosomatic disturbances, and other associated clinical disease should be considered in establishing prognosis for disposition.

b. The following outline may be helpful in classifying allergic disease as to prognosis for disposition purposes. The major allergic states are listed with brief qualifying remarks.

(1) HAY FEVER:

(a) Mild:

(1) Intermittent attacks, occurring only a few hours a day.

(2) Physical signs minimal or absent.

(3) No interference with discharge of duties or with sleep.

(4) Minimal symptomatic medication required.

(5) Satisfactory control with injection therapy.

(b) MODERATE:

(1) Sustained attacks, occurring throughout the day, including eye symptoms.

(2) Physical signs present.

(3) Minimal interference with discharge of duties and with sleep.

(4) Symptomatic medication required frequently.

(5) Inadequate control of attacks with injection therapy.

(c) Severe:

(1) Constant, daily symptoms including eye symptoms.

(2) Constant physical signs present, including copious nasal secretion and nasal obstruction interfering with breathing.

(3) Substantial interference with discharge of duties and with sleep.

(4) Failure to control symptoms with injection and symptomatic therapy.

(2) RHINITIS, VASOMOTOR:

(a) Mild, Moderate and Severe:

(1) Criteria are the same as for hay fever, except eye symptoms usually are not a factor.

(2) The degree of hyperplasia of the nasal mucosa may be used as a criterion in addition to the other factors.

(3) ASTHMA, BRONCHIAL:

(a) Mild:

(1) Attacks with demonstrable occasional scattered physical signs (sibilant and sonorous sounds), an average of twice a month or less, readily controlled by oral symptomatic treatment.

(2) No significant interference with discharge of duties.

(3) Physical signs absent between attacks.

(b) Moderate:

(1) Attacks with demonstrable gross dyspnea and wheezing, correspondingly diffuse physical signs, an average of twice a month or more, not controlled by epinephrine.

(2) Interference with discharge of duties during attacks.

(3) Physical signs absent between attacks.

(c) Severe:

(1) Attacks with demonstrable intense gross dyspnea and wheezing, correspondingly marked diffuse physical signs, an average of twice a month or more, not controlled by epinephrine.

(2) Definite interference of discharge of duties.

(3) Physical signs usually present daily.

(4) Significant decrease in vital capacity.

(5) Presence of irreversible pulmonary changes, as pulmonary emphysema, chronic bronchitis and bronchiectasis.

(6) Repeated hospitalization for relief of attacks.

NOTE: All that wheezes is not asthma; one attack per se, the duration of which is no longer than that of acute bronchitis, should not necessarily be designated as bronchial asthma.

(4) URTICARIA:

(a) Mild:

(1) Acute attack of short duration (one to four days).

(2) Demonstrable etiology, as ingestion of food or drug or injection of drug or antitoxic agents that can be easily eliminated.

(3) Complete relief with therapy.

(4) Chronic urticaria, in general, should not be classified as mild.

(b) Moderate:

(1) Acute. The same criteria as listed for mild urticaria is applicable except that the extent of involvement and the duration of attack is greater and an inadequate

response to therapy is noted. Association of occasional angioneurotic edema suggests a moderate degree.

(2) **Chronic:**

(a) Frequent attacks (one a month or more) with alternating periods of freedom.

(b) Etiology usually intrinsic, psychogenic or undetermined, rarely a common food.

(c) **Inadequate response to treatment.**

(d) Frequent sick call rate with demonstrable urticaria.

(c) Severe:

(1) Acute urticaria need not be termed "severe".

(2) **Chronic:**

(a) Attacks occurring daily or almost daily or lesions appearing constantly involving all surface areas.

(b) Frequent association with angioneurotic edema.

(c) Etiology - same as moderate, chronic urticaria.

(d) **Inadequate response to treatment.**

(e) **Repeated hospitalization.**

2. EXCERPTS OF OFFICIAL REGULATIONS.

a. MR 1-9, 19 April 1944, stating that bronchial asthma, severe hay fever and severe allergic dermatoses are disqualifying.

b. AR 40-105, 14 October 1942, stating that bronchial asthma of any degree and a history of asthma, other than in childhood, with a trustworthy history of freedom from manifestations during the preceding ten (10) years; chronic eczema; urticaria; and angioneurotic edema are disqualifying for commission. (This may be applied to AR 40-110, Standards of Physical Evaluation for Flying).

c. AR 40-1025, 12 December 1944, stating that "mere recurrences of certain diseases within a short period after the patients' entrance into active service, such as ....., seasonal asthma,.....do not establish increase in the degree of disability"; and "....., advancement of such conditions as .....bronchial asthma (not established as seasonal) can be expected to have been caused by exertion, exposure or other adverse influence of the military service".

3. EVALUATION OF ALLERGIC DISEASE FOR RECOMMENDATION FOR DISPOSITION.

The following factors should be considered in determining the proper recommendations for disposition:

a. **Type of Allergic Disease.**

b. The Degree of the Disease (See Sec. V, par. 1).

c. The Prognosis, with and without allergic management under conditions prevailing in theaters of operations as well as the Zone of Interior.

d. Related diagnoses, such as anxiety states and other psychogenic disturbances, sinus

disease, hypothyroidism, as contributing factors to allergic disease.

e. Unrelated diagnoses, such as certain orthopedic, ophthalmologic and other medical conditions.

f. The individual. The ambition, morale, "sick call" and hospitalization rate of any given case.

4. COMMENT. The recommendations for disposition of military personnel with allergic diseases can be accomplished without great difficulty in the groups classified as mild and severe. In general, the group listed as mild may be returned to general military duty and the group defined as severe should be considered candidates for separation from the service. The group of patients designated as having allergic disease of moderate degree presents a greater problem of interpretation as to duty status. In general, cases of moderate degree may be recommended for restricted military duty in the Zone of Interior. There are exceptions to this statement. It may be advisable to separate from the service many cases with a moderate degree of asthma. On the other hand, patients with moderate hay fever, due to ragweed pollen, may be recommended for full duty since they will be symptom free in areas outside of the United States, as this plant is relatively non-existent elsewhere (except the Hawaiian Islands). In allergic disease of moderate degree, emphasis should be placed on the variable factors which influence the personality of the allergic individual, such as psychosomatic disturbances, motivation for military duty, etc., when recommending disposition of a final nature.

The preceding paragraph will not be considered as a directive, but as a guide for the disposition of AAF Personnel with Allergic Diseases.

APPENDIX

1. DIAGNOSIS CHART. Chart 1 is a summary of the diagnostic factors in allergic diseases.

2. EQUIPMENT. The basic equipment with corresponding supply numbers for use in an allergy clinic is outlined.

3. SYRINGE TRAY. Figure 1 is a schematic drawing of a wooden tray suitable for holding syringes used in skin testing.

4. POLLEN SLIDE HOLDER. Figure 2 is a schematic drawing of wooden apparatus suitable for protecting an exposed pollen slide.

5. POLLEN DISSEMINATION. Figure 3 is a map of the United States showing zones of pollen dissemination and a table of the relative pollen concentrations in the respective zones. (See page 42)

6. ALLERGY EXAMINATION FORM. Figures 4 and 4a are suggested allergy examination forms for use as allergy clinic records and in hospital ward charts. Figure 4 is a form for recording all pertinent data except skin test reactions which may be recorded on a form as shown in Figure 4a. In practice, Figure 4a should be the reverse side of figure 4. This combined form may be reproduced at each local station.

7. FOOD DIARY. Figure 5 is a sample food diary, explained in Section III, paragraph 10, b, text of manual.

8. ALLERGY TREATMENT RECORD. Figures 6 and 6a are suggested forms for use in transmitting the record of treatment administered to any patient. Figure 6 outlines the general methods of injection therapy; Figure 6a is a form for recording the injection treatment given. In practice, Figure 6a should be the reverse side of Figure 6. This combined form is applicable in cases on temporary or permanent change of station when continuation of the injection therapy seems advisable. It may apply either when extracts are to be transmitted with the patient or when he is transferring to an area where there is a known AAF Allergy Service (when extracts will not be transmitted with the patient). This combined form may be reproduced at each local station.

9. HISTORICAL BACKGROUND. A short citation in chronologic order of some of the important developments in Allergy is outlined. There are many other important contributions to the literature that are not cited.

10. BIBLIOGRAPHY. References to the "Historical Background" section are made.

11. BOOKS FOR GENERAL REFERENCE. Books pertaining to Allergy are listed.

12. PREPARATION OF FIELD'S STAIN.

CHART I

SUMMARY OF DIAGNOSTIC FACTORS IN ALLERGIC DISEASES

	Symptoms	Physical Signs	Skin Tests	Cytology (Eosinophiles)	Miscellaneous
Hay Fever (Seasonal)	Sneezing in paroxysms, thin nasal secretion, intermittent nasal obstruction; itching lacrimation and redness of eyes	Pallor, edema, glistening of nasal mucosa; lacrimation and reddening of eyes	Positive to appropriate pollens	Nasal secretion: positive	
Chronic Rhinitis	Similar to nasal symptoms of Hay Fever	Similar to Hay Fever; Frequent hyperplasia and polypoid degeneration	Extrinsic type positive Intrinsic type negative	Nasal secretion: positive	X-ray sinuses; bacteriology of nasal sinuses and nasopharynx
Bronchial Asthma	Wheeze, dyspnea, cough; Extrinsic: sporadic symptoms; Intrinsic: persistent or frequent symptoms, constant cough in chronic cases	Sibilant and sonorous sounds chiefly expiratory; prolonged expiration; Extrinsic: signs present with symptoms. Intrinsic: signs usually demonstrable at all times in chronic cases	Extrinsic type positive Intrinsic type negative	Sputum-positive	Decreased vital capacity (variable); X-ray chest: negative in uncomplicated asthma; Relief with epinephrine and aminophylline
Urticaria	Hives, itching	Typical wheal formation varying in size	Usually negative	Blood: Positive or negative, usually negative	Presence of foci of infection, endocrine dysfunction, psychogenic factors (all variable)

CHART 1 (Cont'd)

Allergic Disease	Symptoms	Physical Sign	Skin Tests	Cytology (Eosinophiles)	Miscellaneous
Angioneurotic Edema	Areas of edema and redness; chiefly eyelids, lips, tongue, feet, hands; at times itching and pain	Typical areas of edema and redness	Same as urticaria	Same as urticaria	Same as urticaria
Anaphylactic Shock	Weakness, anxiety, dyspnea, wheezing, etc.	Urticaria, asthma, shock, Collapse	Positive: Foreign serum	Blood: variable	Primarily an immediate reaction to foreign protein (usually antisera) given parenterally
Serum sickness	Fever, itching, swollen joints and glands	Urticaria, fever, arthritis, lymphadenopathy	Positive: Foreign serum	Blood: variable	Delayed reaction to foreign protein (usually antisera) given parenterally
Enteritis, allergic	Diarrhea, abdominal pain; frequently nausea and vomiting	Abdominal tenderness; absence of signs of surgical abdomen	Usually negative	Blood: variable	Usually relief of pain with epinephrine
Eczema	Itching, skin rash	Monomorphous and vesicular dermatitis excoriations, lichenification; chiefly flexural areas and face	Variable	Blood: variable	

Page 36 missing

EQUIPMENT

1. The basic equipment suggested for use in an Allergy Clinic is as follows:

a.	2014000 X	Cotton, absorbent, 1-lb roll (For nasal applicators)	Carton
	2023000 X	Gauze, plain, 36-inch, 100 yard, roll (For alcohol sponges)	Package
	2085000 X	Plaster, adhesive, surgical, 3-inch by 5 yards (For patch tests)	Spool
	3267000	Forceps, sponge, 9 1/2-inch, straight, Foerster	Each
	3468000	Scissors, bandage	Each
	3521000	Speculum, nasal, Ingal	Each
	3611000 X	Applicator, wood, 6 gross (For cotton swabs)	Carton
	3668000	Depressor, tongue, wood, 100	Carton
	3689000	Headband, adjustable strap	Each
	3691000	Headband mirror	Each
	3773000	Stethoscope	Each
	3843000 X	Syringe, Luer, 1-cc	Each
	3845000 X	Syringe, Luer, 10-cc	Each
	3847000 X	Syringe, Luer, needle, 25 gauge, 1/4-inch canula, 12	Box
	3879300 X	Tubing, rubber, latex (For tourniquet)	Foot
	NS-3	Lamp, condensor	Each
	4205000 X	Jar, specimen, 1-pint (For forceps and sponges)	Each
	4335000 X	Slide, microscope, 75 by 25 mm, 72 (For nasal smears)	Carton
	7178000	Towel, hand (For covering sterile syringes)	Each
	7917005	Sterilizer, instrument, small, 110-volt, AC-DC	Each
	9024500	Dish, vegetable, enamelware (For sterile syringes)	Each

2. The following drugs should be available at all times in an allergy clinic:

Epinephrine (1-1,000)

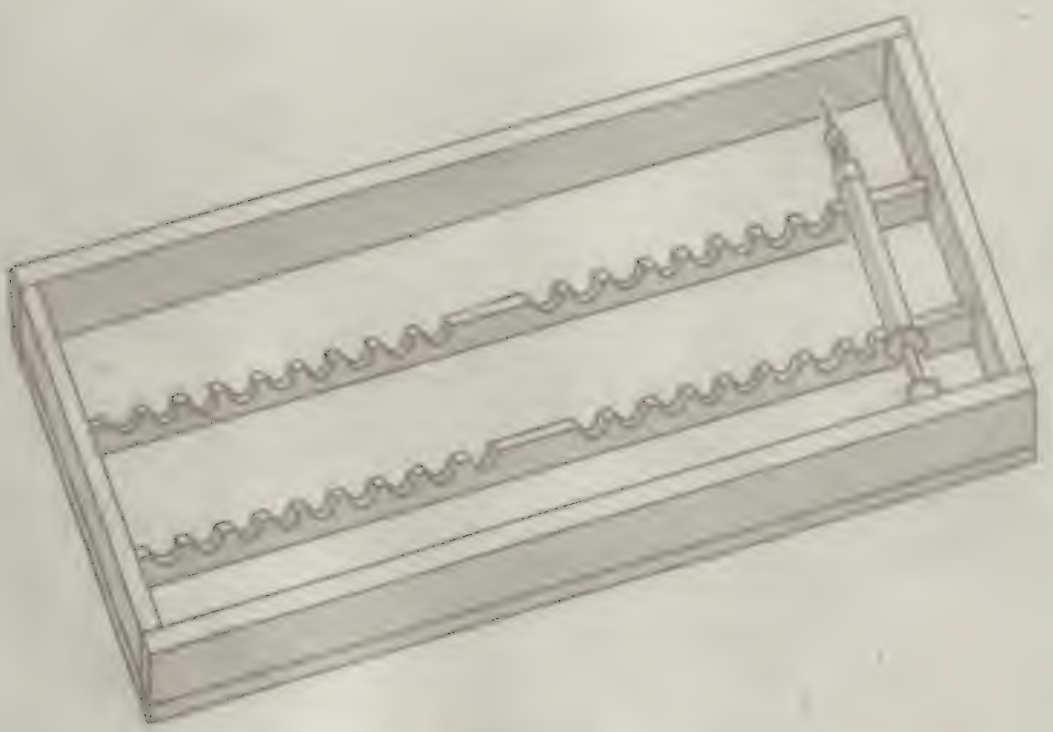
Aminophylline (0.24 Gram)

Calcium Gluconate or Chloride (1 Gram)

Ointment of 1% Ephedrine, Sulfate or Chloride (1/4% to 1/2% Neosynephrine.

c. Syringe trays may be prepared with wood to support syringes containing extracts for testing. This is not standard supply. A diagram of such a tray is shown in Figure 1.

FIG. 1

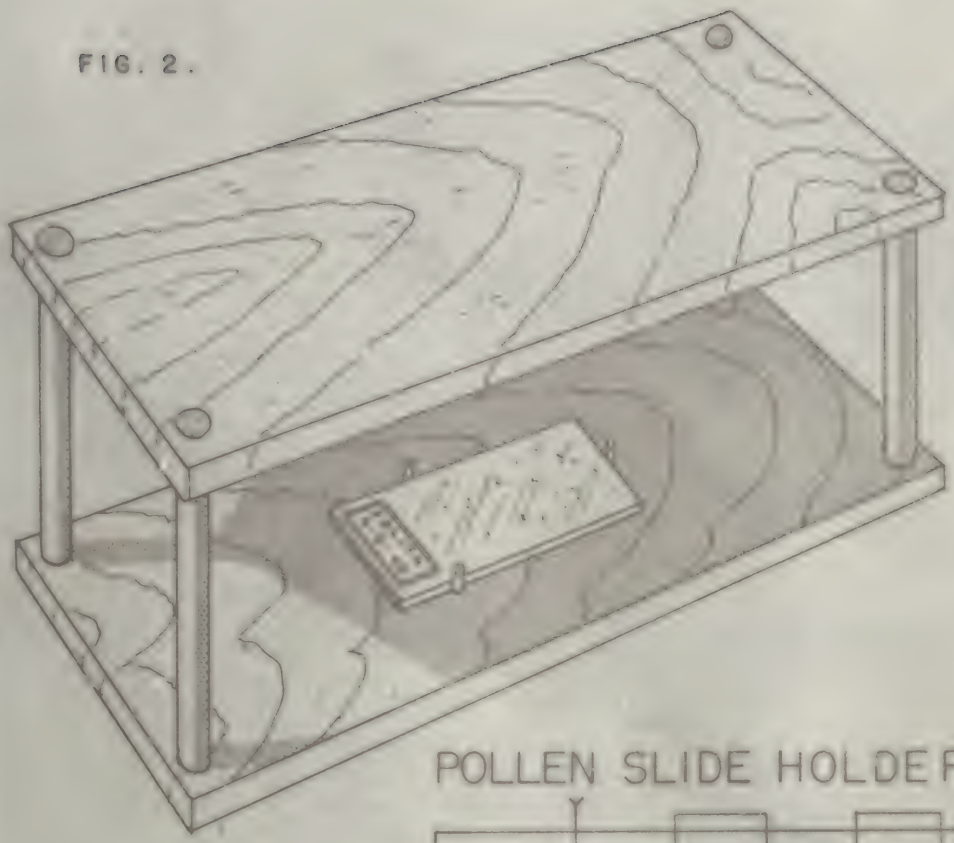


ALLERGY SYRINGE TRAY

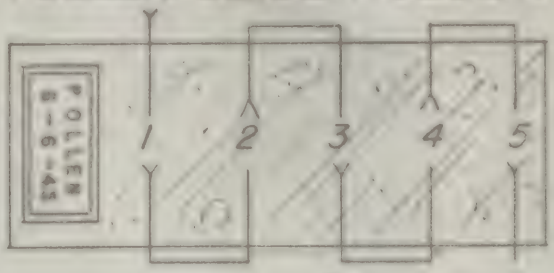
OVERALL: 13" long X 7" wide X $1\frac{1}{4}$" deep

GROOVES: $\frac{3}{8}$" diam, $\frac{10}{16}$" center to center

FIG. 2.



POLLEN SLIDE HOLDER



HOLDER APPROX. 3 to 4 TIMES THE SIZE OF SLIDE; ROOF SUPPORTED BY DOWELS 3" ABOVE BASE.

HOLDER SHOULD BE POSITIONED ABOUT 25' ABOVE GROUND WITH UNOBSTRUCTED EXPOSURE.

POLLEN COUNTING

MICROSCOPIC EXAMINATION (low power) OF 5 CROSS SECTIONS OF VASELINED SLIDE OF 24 hr. EXPOSURE REVEALS APPROX. NO. OF POLLEN GRAINS PER CUBIC YARD OF FREE LOCAL AIR.

FIG. 3.

ZONES OF POLLENATION

POLLENS	ZONES			
	I	II	III	IV
TREES				
CEDAR		+++		+++
COTTONWOOD		++	++	++
ELM	+	+	+	+
HICKORY	++	++		+
OAK	+++	+++	++	+
GRASSES				
BERMUDA		+++		+++
JUNE GRASS	+++		++	
TIMOTHY	+++	++	++	
WEEDS				
CARELESSWEED		++	++	+++
GOOSEFOOT		+	+++	++
RAGWEED	++++	+++	++++	++
RUSSIAN THISTLE			+++	+++
SAGE BRUSH			+++	+++
PLANTAIN	+++	+	+	+

THIS CHART IS BASED UPON THE REPORTS OF ATMOSPHERIC POLLEN SURVEYS IN EACH OF THE FOUR ZONES. ONLY THOSE POLLENS SUPPLIED FOR USE IN THE A.A.F. ARE INCLUDED.

Page 42 missing

ALLERGY EXAMINATION
AAF REGIONAL HOSPITAL
_____, _____

File #: _____
Date: _____
Source: _____

Name: _____ ASN: _____ Rank: _____
Age: _____ Home: _____ Station: _____

P. I.:

P. H.:

F. H.:

P. E.:

CYTOLOGY: Nasal:
Sputum:

X-rays:

TESTS:

TENTATIVE DIAGNOSIS:

FINAL DIAGNOSIS:

COMMENT:

_____
M.C.

(Figure 6)

ALLERGY SKIN TESTS

Case# _____

Date _____

POLLENS	Test Strengths PNU* per cc. and Reactions				INHALANTS	Test Strength PNU* per cc.	REACTION
	10	100	1,000	10,000			
Mountain Cedar					Dust	100	
Oak					Dust	1,000	
Cottonwood					Feathers	100	
Elm					Cottonseed	100	
Hickory					Dog dander	100	
Timothy					Cat dander	100	
Bermuda grass					Alternaria	1,000	
June grass					Hormodendrum	1,000	
Plantain					Helminthosporium	1,000	
Ragweed					Aspergillus	1,000	
Careless weed							
Russian thistle							
Goosefoot							
Sagebrush							
						Test Strength	
					MISCELLANEOUS	In Dilutions	REACTION
					Stock Vaccine	1-100	
					Stock Vaccine	1-10	
					Horse Serum	1-100	
					Horse Serum	1-10	

INTERPRETATION OF REACTIONS:

NEGATIVE (neg): Original bleb - no reaction.
SLIGHT (sl): A small wheal less than 1 cm. in diameter.
MODERATE (mod): A wheal 1 cm. or more in diameter but without pseudopodia.
MARKED (mrk): A wheal 1 cm. or more in diameter with pseudopodia.

*PNU. = Protein Nitrogen Unit(s)
1 PNU. = 0.00001 mgm. of Phosphotungstic Acid Precipitable Nitrogen

REMARKS:

(Figure 4a)

SAMPLE FOOD DIARY

	11/10/44	11/11/44 Hives 9 A.M. to 6 P.M.	11/12/44	11/13/44	11/14/44 Hives 5 P.M. to 10 P.M.	11/15/44 Hives 4 P.M. to Bedtime
Eggs	X			X	X	
Coffee	X X	X	X	X	X X	X
Wh. Bread	X X	X		X	X X	X X
Milk	X X	X X	X	X X	X	X X
Apples	X		X			X
Corn Flakes	X	X	X	X		X
Beef	X		X X X	X		
Wh. Potatoes	X X		X	X		X
Gr. Peas	X		X	X		X
Beets	X	X	X			X
Pork	X	X			X	X
Lima Beans	X		X	X X		X
Oranges		X	X	X		
String Bns		→	X		X	X
Chicken		X				
etc.						

(Figure 5)

ALLERGY TREATMENT RECORD

Date: _____

Name: _____ A.S.N. _____ Grade: _____

Diagnosis:

THE SCHEDULES LISTED BELOW ARE SUGGESTED AS A GUIDE FOR INJECTION THERAPY
(See reverse side for skin tests and record of treatment)

PERSEASONAL POLLEN EXTRACT DOSAGE (PROTEIN NITROGEN UNITS)

Treatment Number	Class A marked test to 10 PNU/cc	Class B marked test to 100 PNU/cc	Class C marked test to 1000 to 10,000 PNU/cc	Reaction
1	1	10	10	
2	5	20	20	
3	10	40	50	
4	15	70	100	
5	25	100	300	
6	40	200	500	
7	60	300	700	
8	80	500	1000	
9	100	700	1500	
10	150	1000	2000	
11	200	1500	3000	
12	300	2000	5000	
13	500	3000	7000	
14	700	4000	9000	
15	900	5000	10000	
16	1200	6000	10000	
17	1500	7000	10000	
18	2000	8000	10000	
19	2500	9000	10000	
20	3000	10000	10000	

CO-SEASONAL POLLEN EXTRACT

Daily intracutaneous injections of pollen extract, using a skin test volume of the weakest strength of extract giving a marked reaction (pseudopodia) until the symptoms are controlled; thereafter 2 or 3 times weekly.

DUST AND AIRBORNE MOLDS

Patients having a marked reaction with strengths 100 PNU per cc. may be treated, in general, according to a Class A pollen sensitivity; those requiring test with 1000 PNU per cc. may be treated according to a Class B pollen sensitivity, except that the maximum dose is not over 2000 PNU.

STOCK VACCINE

Initial dose is 0.1 cc. of a 1-1000 or 1-10,000 dilution and are increased by 0.2 cc. until a maximum dose of 0.1 cc. of a 1-10 dilution is attained.

NOTE: Constitutional Reactions, as a result of injection therapy or skin test manifested by pruritis, erythema, urticaria, rhinitis and asthma should be treated by applying a tourniquet proximal to the site of injection and administration of epinephrine 1-1000, 0.3 cc. in opposite arm and repeat if necessary.

For details, see AAF Manual of Allergy. (Figure 6)

RECORD OF TREATMENT
ALLERGENIC EXTRACTS

Extracts (Line 1)							
Skin Test (Line 2)							
Date							

1. Record allergenic extracts used in treatment on line 1.
2. Record weakest strength of extract inducing marked (pseudopodia) reaction on line 2.
3. Record dates and treatment dosage in proper columns.

(Figure 6a)

Page 48 missing

HISTORICAL BACKGROUND

In 1565, Botsilo recognized the symptoms now known as hay fever. (From Major's "Classic Description of Disease")

In 1819, Bostock described the symptomatology of hay fever as "summer coryza" and Elliotson, in 1830, attributed "summer coryza" to pollen in the air but was unable to prove his hypothesis.

In 1873, Blackley, who had suffered from "summer coryza" produced sneezing, watery nasal secretion and itching, redness and tearing of his eyes by applying dry pollen grains to his nose and eyes, and produced a skin wheal and erythema (positive skin test) by applying pollen to an abrasion of his skin.

In 1893, diphtheria antitoxin was first produced by Von Behring. It was noted that many animals receiving a second (2nd) injection of toxin after an interval of two (2) or three (3) weeks would die of shock.

In 1902, Richet coined the term "anaphylaxis" to denote the state of shock resulting from a repeated injection of foreign protein into an animal.

In 1908, the many studies of anaphylaxis led Wolff-Eisner to describe hay fever in the human being as a manifestation of anaphylaxis.

In 1906, the term "allergy" was coined by Von Pirquet to denote an altered reaction to a substance which causes no harm in the majority of individuals, or a changed reactive capacity exhibited by some individuals on exposure to a certain foreign substance.

In 1911, Noon first described the "desensitization" method of treatment of hay fever by means of injections of pollen extracts. Since then the injection method of treatment with extracts of offending allergens has been used extensively.

In 1916, Cooke demonstrated house dust to be a specific allergen.

In 1921, Prausnitz and Kustner described the passive transfer phenomenon in which the blood serum of a case of hay fever has the capacity of locally sensitizing the skin of a non-allergic individual when injected intracutaneously so that the sensitized area of skin reacted with wheal and erythema formation when tested with the particular pollen extract. This property of allergic serum is frequently spoken of as "skin sensitizing antibody" or "reagin". This phenomenon has since been used extensively in research and clinical application.

In 1928, Alexander and his co-workers reported studies on the effect of asthma on the heart, and in 1932 evaluated skin testing in allergy.

In 1933, Cooke and Stull first standardized allergen extracts on the protein nitrogen content of the extract.

In 1935, Cooke and his associates described the "blocking antibody" as a property of the human blood sera of treated cases of hay fever capable of combining and neutralizing pollen antigen, a property induced by injections of pollen extract.

In 1940, Loveless demonstrated this blocking antibody or antigen combining antibody to be thermostabile, whereas the skin sensitizing antibody (responsible for the positive skin and passive transfer tests) is destroyed at 56 degrees centigrade for four (4) hours.

In 1941, Cooke and his associates showed that the antigen combining antibody (produced as a result of injections of pollen antigen) diffused through human placenta, whereas the skin sensitizing antibody was not diffusable.

In 1943, Hampton and his co-workers demonstrated the "thermostable antibody" in sera of patients treated with ragweed extract by means of the precipitin test.

In 1942, French and Halpin reported on the management of cases of allergic disease occurring in military personnel.

In 1944, Simpson and Rand discussed the problem of allergy and outlined a plan of diagnosis of allergic disease in the Army Air Forces.

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1. PREPARATION OF FIELD'S STAIN.

Solution (A)

Methylene blue	0.8	gms.
Azur B (American stains)	0.8	
Disodium phosphate(anhydrous)	5.0	
Potassium phosphate, monobasic (anhydrous)	6.25	
Distilled water	500	cc

Solution (B)

Eosin	1.0	gms.
Disodium phosphate (anhydrous)	5.0	
Potassium phosphate, monobasic (anhydrous)	6.25	
Distilled water	500	cc

The phosphate salts are first dissolved, then the stain is added. Solution of the granular Azur B is aided by grinding in a mortar with a small quantity of the phosphate solution. The solutions of stain should be set aside for twenty-four (24) hours, and after filtration they are ready for use. The same solutions may be used for many weeks without deterioration, but the eosin solution should be renewed when it becomes greenish from a slight carry-over of methylene blue.

Should Azur B be unobtainable it is possible to prepare a methylene blue-azur mixture of undefined composition from the medicinal methylene blue. Solution (A) may be prepared as follows:

a. Dissolve 1.2 gms. of medicinal methylene blue and 5.0 gms of anhydrous disodium phosphate in 50 cc. of distilled water.

b. Bring to the boil and then evaporate in a water bath almost to dryness.

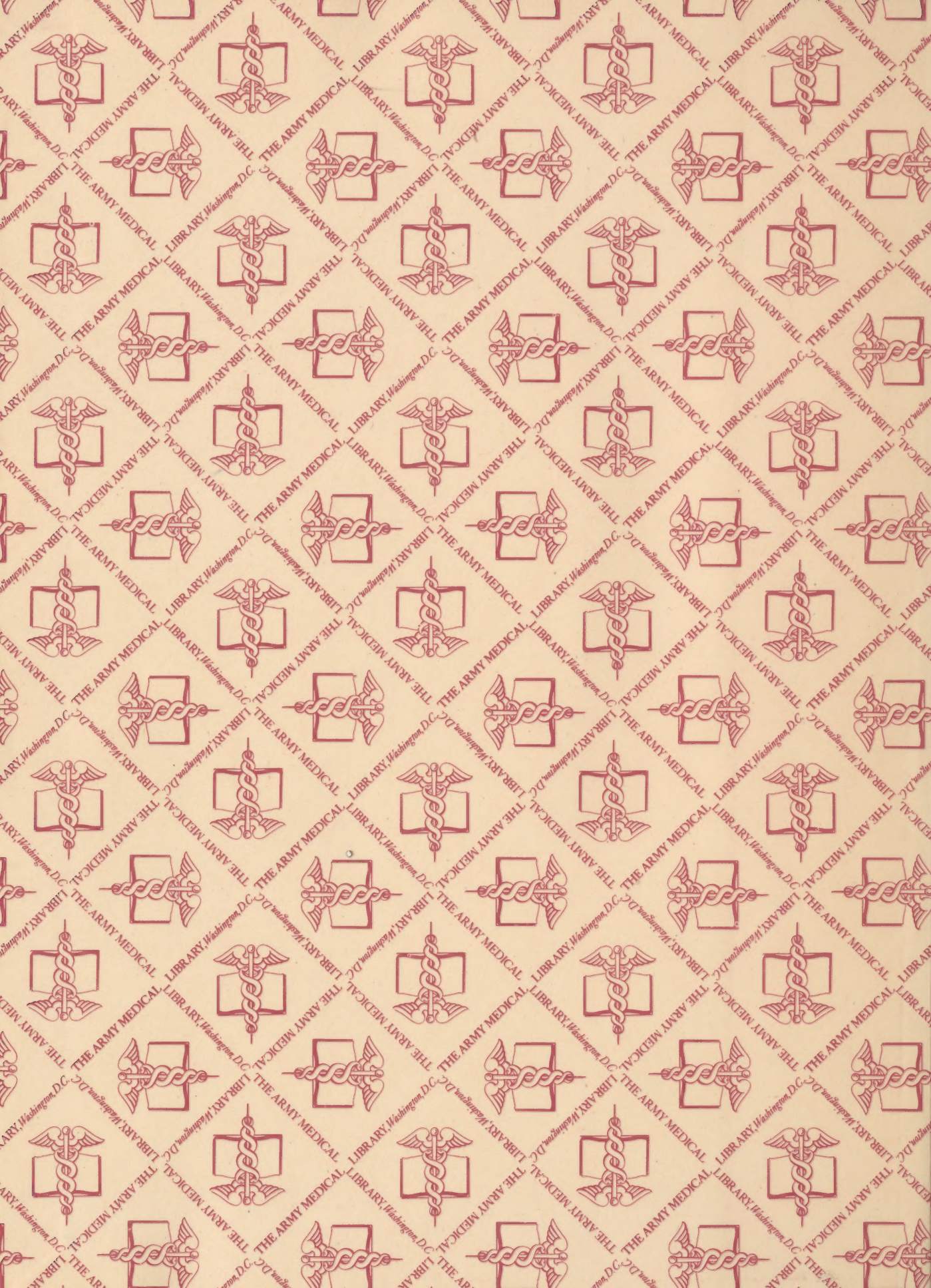
c. Add 6.25 gms of anhydrous potassium phosphate, monobasic.

d. Add 500 cc of distilled water, stir until the stain is completely dissolved and set aside for twenty-four (24) hours.

e. Filter before use.

Reference: J. W. Field, Trans. Royal Soc. Trop Med. and Hyg. Vol 35, No. 1, July 1941.

Meridian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